

Appl. No. 10/765,660  
Docket No.:H1799-00216  
Reply to Office Action of June 28, 2005

### **REMARKS/ARGUMENTS**

A PETITION FOR EXTENSION OF TIME has been filed, concurrently with this Amendment, extending the time for response to the Official Action one (1) month, from September 28, 2005, to October 28, 2005. The Commissioner is hereby authorized to charge the fee, namely, \$120.00, required in connection with the Petition, to Deposit Account No. 04-1679.

As a result of this Amendment, claims 1, 2, 5-10, 15-18, 21-26, 31 and 59 are under active consideration in the subject patent application.

In the Official Action, the Examiner has:

- (1) acknowledged Applicants' amendment filed 4/15/2005 and stated that the previously indicated allowability was withdrawn in view of the present rejections;
- (2) objected to the specification as allegedly failing to provide for proper antecedent basis for the subject matter claimed in claim 59;
- (3) rejected claim 59 under 35 U.S.C. §112, first paragraph;
- (4) provisionally rejected claims 1-2, 5-10, 15-18, 21-26, 31 and 59 under the judicially created doctrine of double patenting over claims 1 -29 of copending U.S. Patent Application No.10/607,337, and in view of U.S. Pat. No. 3,828,849, issued to Corman et al., and stated that a timely filed terminal disclaimer in compliance with 37 C.F.R. 1.321(c), may be used to overcome this rejection; and

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(5) rejected claim 59 under 35 U.S.C. § 103(a) in view of the proposed combination of Japanese Pat. No. JP 359024538A, issued to Yoshizumi, and U.S. Pat. No. 3,828,849, issued to Corman et al.

With regard to Items 1-3, Applicants traverse the Examiner's withdrawal of the prior indication of allowability, and request reconsideration for the following reasons. The Examiner has objected to the specification and subsequently rejected claim 59 alleging that ". . . a wick disposed on at least one of said internal surface and comprising a plurality of aluminum and magnesium particles joined together by an aluminum/magnesium intermetallic alloy brazing compound is not described in the specification. . . ." The is simply not true.

More particularly, at paragraph 50 of the instant application, Applicants disclose:

**"Metal particles 27 may be selected from any of the materials having high thermal conductivity, that are suitable for fabrication into brazed porous structures, e.g., carbon, tungsten, copper, aluminum, magnesium, nickel, gold, silver, aluminum oxide, beryllium oxide, or the like, and may comprise either substantially spherical, oblate or prolate spheroids, ellipsoid, or less preferably, arbitrary or regular polygonal, or filament-shaped particles of varying cross-sectional shape. For example, when metal particles 27 are formed from copper spheres (Fig. 5) or oblate spheroids (Fig. 6) whose melting point is about 1083°C, the overall wick brazing temperature for heat pipe 2 will be about 1000°C. By varying the percentage brazing compound 30 within the mix of metal particles 27 or, by using a more "sluggish" alloy for brazing compound 30, a wide range of heat-conduction characteristics may be provided between metal particles 27 and fillets 33." [Emphasis added]**

Thus, there is more than ample disclosure within the written portion of the specification to support the subject matter defined in claim 59, and one of ordinary skill in the art would well understand the meaning of these terms upon

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review of the specification as filed. In particular, Applicants clearly state in at least paragraph 50 that metal particles may be selected from a variety of materials having high thermal conductivity, and that are suitable for fabrication into brazed porous structures, i.e., a brazed wick, including aluminum and magnesium. Consequently, the terms and phrases used in claim 59 find clear support or antecedent basis in the description at least at paragraphs 50 and 52 so that the meaning of these terms in the claim are ascertainable by reference to the description. Reconsideration and withdrawal of the objection to the specification under 37 C.F.R. § 1.75(d)(1) and MPEP § 608.01(o) and rejection of claim 59 under 35 U.S.C. § 112, first paragraph, are requested.

With regard to Item 4, a Terminal Disclaimer To Obviate A Double Patenting Rejection Over A Pending Second Application is attached to this response and is believed to be in compliance with 37 C.F.R. § 1.321(c). The Terminal Disclaimer has been signed by an Attorney of Record in the case. **The Commissioner is hereby authorized to charge the fees, namely \$130.00, required in connection with the Terminal Disclaimer, to Deposit Account No. 04-1679.** Accordingly, Applicants request entry of the Terminal Disclaimer. Since the Applicants' copending application Serial No. 10/607,337 has been removed as a reference in this case, its proposed combination with the disclosure of Corman is no longer viable. Accordingly, reconsideration and withdrawal of the double patenting rejection of claims 1-2, 5-10, 15-18, 21-26, 31 and 59 are respectfully requested.

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With regard to Item 5, Applicants respectfully submit that the proposed combination of the Yoshizumi and Corman references, fails to teach or suggest the present invention. More particularly, Applicants define a capillary structure for a heat transfer device, e.g., a heat pipe, that includes a plurality of aluminum and magnesium particles joined together by a brazing compound such that fillets of the brazing compound are formed between adjacent ones of the plurality of aluminum and magnesium particles so as to form a network of capillary passageways between the particles, and with at least one vapor vent defined through that capillary structure. Neither Yoshizumi nor Corman teach or suggest such a capillary structure. Reconsideration is requested for the following reasons.

The Yoshizumi reference teaches the use of a eutectic alloy to weld a sintered wick onto the inner wall of a container presumably acting as a heat pipe vessel. A copy of the Yoshizumi reference translated into English is attached to this Response and Amendments for the convenience of the Examiner.

Yoshizumi requires a silver adhesion layer (4) be formed on the surface of copper particles (2) that are to form a wick. This eutectic alloy is then applied to the inner wall surface of Yoshizumi's container by plating or vapor deposition. Significantly (and unlike the invention defined by Applicants' independent claim 59) Yoshizumi heats this structure in a furnace so that the silver is diffused over the copper particles (4), i.e., spread throughout the copper particles so as to coat

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the surface of each copper particle to thereby form a sintered wick structure (see, full English translation of Yoshizumi, third page, line 3-5).

In stark contrast to the teachings of Yoshizumi, Applicants' independent claim 59 defines a capillary structure for use in a heat transfer device, e.g., a heat pipe, that comprises a plurality of aluminum and magnesium particles joined together by a brazing compound such that fillets of the brazing compound are formed between adjacent ones of the plurality of aluminum and magnesium particles so as to form a network of capillary passageways between the particles, and with at least one vapor vent defined through that capillary structure. Yoshizumi does not teach or suggest particles joined together by a brazing compound such that fillets of the brazing compound are formed between adjacent ones of the particles to form a network of capillary passageways. Instead, Yoshizumi requires that a silver adhesion layer (4) be diffused onto the surface of his copper particles (2) so that a sintered wick may be formed.

As discussed at paragraph 6 of Applicants' specification, "*Sintered metal wicks generally comprise a mixture of metal particles that have been heated to a temperature sufficient to cause fusing or welding of adjacent particles at their respective points of contact. The sintered metal powder then forms a porous structure with capillary characteristics. Although sintered wicks have demonstrated adequate heat transfer characteristics in the prior art, the minute metal-to-metal fused interfaces between particles tend to constrict thermal energy conduction through the wick. This has limited the usefulness of sintered*

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*wicks in the art.*" It is well known in the art that sintering metal particles causes minute metal-to-metal fused interfaces or adhesions between the particles to form the sintered wick. It is respectfully submitted that no fillets are produced during a wick sintering process of the type relied upon by Yoshizumi.

The Examiner's reliance upon Yoshizumi is in error since nowhere within the four corners of that reference is there disclosure, or even a vague suggestion of a capillary structure for a heat transfer device, e.g., a heat pipe, that comprises a plurality of particles joined together by a brazing compound such that fillets of the brazing compound are formed between adjacent ones of the plurality of particles so as to form a network of capillary passageways between the particles.

The Examiner further admits that Yoshizumi does not teach or suggest a plurality of vapor vents being defined through a capillary structure, but looks to the disclosure of Corman to supply these missing teachings. In order for a prima facie case of obviousness to be established, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2142 [emphasis added] Thus the Examiner must be relying upon the Corman reference to not only provide the missing teachings to Yoshizumi, but also the requisite motivation to combine. Neither are provided by the Corman reference.

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Corman discloses a heat pipe having a wick that has a plurality of large cross-section openings defined through portions of the wick. However, Corman makes no mention of a wick including a plurality of particles joined together by a brazing compound such that fillets of the brazing compound are formed between adjacent ones of the plurality of aluminum and magnesium particles so as to form a network of capillary passageways between the particles. Instead, Corman merely suggests that the wicking material to be used with his device have a small mean pore size. (col. 1, lines 24-26). At col. 2, lines 40-45, Corman suggests that a wick suitable for use in his device would have a wick formed from “. . . *felt material of [sic] sintered metal fibers. . .*” Corman utterly fails to teach or suggest a wick including plurality of particles joined together by a brazing compound such that fillets of the brazing compound are formed between adjacent ones of the plurality of particles. Thus the combination of Yoshizumi with Corman, relied upon by the Examiner, would suggest to one of ordinary skill a wick formed from sintered copper particles that have been covered with silver, and that have a small mean pore size. This structure is nowhere to be found in Applicants' independent claim 59.

Since nothing in these prior art references would lead a person of ordinary skill in the art to design an apparatus like that described in the application, or defined by claim 59, it appears that hindsight knowledge of the present invention is the only motivation to combine these references. In particular, none of the references relied upon by the Examiner teach or suggest a wick disposed on at

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least one of the internal surfaces of a chambered vessel that comprises a plurality of aluminum and magnesium particles joined together by an aluminum/magnesium intermetallic alloy brazing compound such that fillets of the brazing compound are formed between adjacent ones of the plurality of particles so as to form a network of capillary passageways between the particles, or where at least one vapor vent is defined through that capillary structure. Applicants respectfully submit that the motivation to combine references cannot come from the invention itself. See, In re Oetiker, 24 U.S.P.Q. 2d 1443, 1446. An Examiner commits clear error when rejecting a claimed invention as an obvious combination of the teachings of two prior art references when the prior art provided no teaching, suggestion, or incentive supporting the combination. In re Bond, 910 F. 2d 831, 15 U.S.P.Q. 2d 1566 (Fed. Cir. 1990)

In summary, Applicants submit that the unique apparatus defined by claim 59 is not disclosed in the prior art references, taken as a whole, and there is no teaching or suggestion in the references to support their use in the particular claimed combinations. In the absence of such, the references are improperly combined. In any event, claim 59 defines over the proposed combination of Yoshizumi and Corman.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

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If a telephone conference would be of assistance in advancing  
prosecution of the above-identified application, Applicants' undersigned Attorney  
invites the Examiner to telephone him at 215-979-1255.

Dated: 10/27/05

Respectfully submitted,



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